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EXAMINER	
JANAKIRAMAN, NITHYA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/535,616	FARAHANI ET AL.	
	Examiner	Art Unit	
	Nithya Janakiraman	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-14 and 17-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-14 and 17-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-3, 5-14, and 17-23 are presented for examination. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/21/2007 has been entered.

Response to Arguments- 35 U.S.C. §101

1. Applicant's arguments, see page 6, filed 11/21/2007, with respect to claims 14 and 15 have been fully considered and are persuasive. The rejections of claims 14 and 15 have been withdrawn.

Response to Arguments- 35 U.S.C. §102

2. Applicant's arguments filed 11/21/2007 with respect to claims 1, 11 and 14, in which Brandl does not teach that a "matrix is formed of a plurality of pieces, each piece representing a frequency band", have been considered but are moot in view of the new ground(s) of rejection.

3. Applicant's arguments filed 11/21/2007 with respect to "a radio signal is substantially zero between a plurality of frequency bands" have been fully considered but they are not persuasive.

4. Applicant appears to argue that Brandl discloses only one frequency band, as shown in Figures 3a and 3b. However, Figures 3a and 3b are merely used for exemplary purposes to teach

the concept of gating. Brandl refers to "frequency bands" as "sub bands", with only "*one of six*" sub bands actually depicted in Figure 3 (that band being approximately 300 to 400 MHz). Further descriptions of sub bands and pulsing can be seen on pages 172 and 173. With regards to having "a radio frequency signal that is substantially zero between a plurality of frequency bands", Applicant openly admits that Brandl discloses "signals outside of that single frequency band are relatively low-strength signals resulting from noise and other factors, and are substantially zero". Thus, Brandl teaches multiple frequency bands, between which the signals are substantially zero.

Claim Objections

5. Claim 1, lines 8 and 13 are objected to because of the following informalities: "radio frequency processing circuitry" is previously "radio frequency signal processing circuitry". Proper consistency is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-3, 5-14, and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The term "substantially" in claims 1, 11 and 14 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not

provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. All depending claims are rejected as well.

8. Claim 12 recites "the compressed equivalent signals" twice, which lack antecedent support. Claim 13 is rejected by virtue of its dependency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-3, 5-14, and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over "High Speed Signal Processing with Tapped Dispersive SAW based Delay Lines" (hereinafter Brandl) in view of US 5,987,320 (hereinafter Bobick).

11. Brandl teaches a method for simulating radio frequency signal processing circuitry *(Introduction; Fig. 11, "simulation results")*. However, Brandl does not teach representing a plurality of frequency bands in matrix form.

12. Bobick teaches producing a matrix of integrated time/frequency bands *(col. 10, lines 56-62)*.

13. Brandl and Bobick are analogous art because they are both related to the field of radio frequency (RF) signals.

14. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the matrix representation of Bobick with the RF signal simulation of Brandl, motivated by the desire to have "particularly effective...quality evaluation of signals transmitted in the wireless communication network" *(Bobick: col. 1, lines 16-19)*.

15. Regarding claim 1 (and 14), Brandl and Bobick teach:

A method (and system) using a computer of for simulating radio frequency signal processing circuitry *(Brandl: Part I, "radio transmission"; Fig. 11, "simulation results")*, comprising:

forming a matrix representation of a radio frequency signal in a wireless communication system *(Bobick: col. 10, lines 56-62, "a matrix of joint time/frequency bands")*, wherein the radio frequency signal is substantially zero between a plurality of frequency bands *(Brandl: Figs. 3a & 3b; one sub band of six is represented, with signals outside of the single band at low-strength, resulting from noise and other factors, and are essentially zero)*, and wherein the matrix is formed of a plurality of pieces *(this is the definition of a matrix)*, each piece representing a frequency band *(Bobick: col. 10, lines 56-62, "a matrix of joint time/frequency bands")*;

performing processing on the matrix representation to simulate operation of the radio frequency processing circuitry on the radio frequency signal *(Brandl: Fig. 3, g(t), $r_1(t)$, $r_2(t)$, y(t); Fig. 11, "simulation results")*, the processing forming a processed matrix representation of the radio frequency signal *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*; and

converting the processed matrix representation of the signal *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")* to a representation of the radio frequency signal as operated on by the radio frequency processing circuitry *(Brandl: Fig. 5, "Decision Unit")*.

16. Regarding claim 2, Brandl and Bobick teach:

The method of claim 1 wherein information in the matrix representation of the radio frequency signal is limited to information of the signal in frequency bands of interest *(Brandl: Part I, "...scientific and medical bands, at 2.45 and 5.8 GHz..:").*

17. Regarding claim 3, Brandl and Bobick teach:

The method of claim 1 wherein the processing simulates non-linear operations *(Brandl: see e.g. equation 3.1).*

18. Regarding claim 5, Brandl and Bobick teach:

The method of claim 1 wherein the processing includes linear time invariant processing *(Brandl: Part II, "passive, linear, time invariant")* and non-linear time invariant processing *(see e.g. equation 3.1).*

19. Regarding claim 6, Brandl and Bobick teach:

The method of claim 1 wherein the processing is frequency domain processing *(Brandl: Part II, "...frequency domain are coupled by the dispersion coefficient... ").*

20. Regarding claim 7, Brandl and Bobick teach:

The method of claim 1 wherein the processing is time domain processing *(Brandl: e.g. equation 3.1).*

21. Regarding claim 8, Brandl and Bobick teach:

The method of claim 1 wherein the processing simulates RF receiver front-end processing *(Brandl: Introduction, "radio transmission utilizing chirp signals"; Part II, "six parallel paths with power detectors and RF switches").*

22. Regarding claim 9, Brandl and Bobick teach:

The method of claim 2 wherein the signal is centered about a carrier frequency, and the frequency bands of interest include the carrier frequency and harmonics of the carrier frequency *(Brandl: Part III, equation 3.5, "...the received signal at the matched filter is the superposition of the transmitted chirp signal and the jammer...").*

23. Regarding claim 10, Brandl and Bobick teach:

The method of claim 9 wherein the signal is bandwidth limited to a bandwidth B, and the frequency bands of interest are limited to the bandwidth B *(Brandl: Part III, "...and B is the chirp bandwidth...").*

24. Regarding claim 11, Brandl and Bobick teach:

A method using a computer for modeling circuitry *(Brandl: Part III, "model for the chirp transceiver")*, comprising:

converting a representation of a first radio frequency signal to a matrix representation *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*, wherein the first radio frequency signal is substantially zero between a plurality of frequency bands *(Brandl: Figs. 3a & 3b; one sub band of six is represented, with signals outside of the single band at low-strength, resulting from noise and other factors, and are substantially zero)*, and wherein the matrix is formed of a plurality of pieces *(this is the definition of a matrix)*, each piece representing a frequency band *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*;

processing the matrix representation to form a further matrix representation to simulate operation of radio frequency circuitry on the first radio frequency signal; and

converting the further matrix representation *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")* to a representation of a second radio frequency signal resulting from operation of the circuitry on the first radio frequency signal *(Brandl: Fig. 5, LP).*

25. Regarding claim 12, Brandl and Bobick teach:

The method of modeling circuitry of claim 11 wherein the frequency bands of the first radio frequency signal are centered about a carrier frequency and harmonics and sub-harmonics of the

carrier frequency *(Brandl: Figs. 3 &4, "frequency bands or sub bands distorted by the radio channel...")* and the compressed equivalent signals are formed by restricting information in the compressed equivalent signals to signal components about the carrier frequency and harmonics and sub-harmonics of the carrier frequency *(Brandl: Fig. 5, "Chirp Compressor")*.

26. Regarding claim 13, Brandl and Bobick teach:

The method of modeling circuitry of claim 12 wherein the first radio frequency signal is bandwidth limited and the matrix representation is bandwidth limited *(Brandl: Part II, "...signals within its bandwidth are heavily suppressed...")*.

27. Regarding claim 17, Brandl and Bobick teach:

A method according to claim 1, wherein the matrix representation is a frequency domain matrix representation, and wherein each piece of the matrix representation comprises a vector of a plurality of frequency components *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*.

28. Regarding claim 18, Brandl and Bobick teach:

A method according to claim 17, wherein all pieces of the matrix representation have the same number of frequency components *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*.

29. Regarding claim 19 (and 23), Brandl and Bobick teach:

A method according to claim 17, wherein the processing includes a convolution operation *(Brandl: page 174, "The output signal g(t) of the matched filter is the convolution of the impulse response h(t) with the received signal $s_j(t)$")*, and wherein performing the convolution operation includes:

converting the frequency domain matrix representation to a time domain matrix representation *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*; and

performing a multiplication operation on the time domain matrix representation *(Brandl: the operations of multiplication conducted in g(t) are performed for the matrix of Bobick)*.

30. Regarding claim 20, Brandl and Bobick teach:

A method according to claim 19, wherein the simulated radio frequency processing circuitry includes a non-linear block *(Brandl: see e.g. equation 3.1)*, wherein the operation of the non-linear block is simulated by evaluating a polynomial having a degree of at least two *(Brandl: Fig. 5, $r_1(t)$, $r_2(t)$)*, and wherein the time domain matrix representation is the variable of the polynomial *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands")*.

31. Regarding claim 21, Brandl and Bobick teach:

A method according to claim 17, wherein the processing includes performing, on the frequency domain matrix representation *(Bobick, col. 10, lines 56-62, "a matrix of joint time/frequency bands*, at least one of the operations of component-wise addition and component-wise multiplication *(Brandl: the operations of addition and multiplication conducted in g(t) are performed for the matrix of Bobick)*.

32. Regarding claim 22, Brandl and Bobick teach:

A method according to claim 17, wherein the processing includes performing a convolution on the frequency domain matrix representation, wherein the convolution is performed piecewise *(Brandl: page 174, "The output signal g(t) of the matched filter is the convolution of the impulse response h(t) with the received signal $s_j(t)$")*.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nithya Janakiraman whose telephone number is 571-270-1003. The examiner can normally be reached on Monday-Thursday, 8:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571)272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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